

## Earth Science Curriculum Support Document

Unit Title:	Astronomy	Number of Days:	12	
Essential Standard:	EEn.1.1 Explain the Earth's role as a body in space.			
Clarifying Objective	Student Friendly Objective	Assessment / Evidence of Proficiency	Instructional Strategies / Resources / Informational Technology Integration	Essential Vocabulary
EEn.1.1.1 Explain the Earth's motion through space, including precession, nutation, the barycenter, and its path about the galaxy.	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Explain the structures of the universe.</li> <li>*Explain the Earth's motion through space.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Earth's Motion Webquest: My Solar System</p> <p><a href="#">Earth's Revolution Applet</a></p>	rotation, revolution, precession, barycenter, galaxy, universe, solar system, nutation
EEn.1.1.2 Explain how the Earth's rotation and revolution about the Sun affect its shape and is related to seasons and tides.	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Describe why we have seasons.</li> <li>*Describe tides and the forces behind them.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Demonstration - basketball &amp; flashlight.</p> <p><a href="#">Solar System</a> (Click on "Earth Science" and then "My Solar System")</p> <p><a href="#">Seasons</a></p> <p><a href="#">Lunar Phases</a></p> <p><a href="#">Tides</a></p> <p>Discovery video - "If We Had No Moon"</p>	rotation, revolution, tides,

EEn.1.1.3 Explain how the sun produces energy which is transferred to the Earth by radiation.	<p>The student will be able to:</p> <p>*Differentiate between nuclear fission and fusion.</p> <p>*Explain how the sun produces energy and how it is transferred to Earth.</p>		<p>Guided Notes, Diagrams</p> <p>Properties of Stars Interactivity (SAS)</p> <p>Activites on Stellar Evolution Stellar Evolution</p> <p><a href="#">H-R diagram Simulator</a></p> <p><a href="#">Cosmic Connections</a></p>	Fusion, fission, electromagnetic waves, X-rays, cosmic rays
EEn.1.1.4 Explain how incoming solar energy makes life possible on Earth.	<p>The student will be able to:</p> <p>*Differentiate between heating of land vs. water and explain how the Earth's magnetic field protects against solar radiation.</p> <p>*Explain how incoming solar energy is transformed by photosynthesis.</p>	Unit 1 Test	<p>Guided Notes, Diagrams</p> <p>Lab - measure the differences in temperature when a heat lamp is placed over sand vs. water</p> <p>Unit Review Activities</p>	Photosynthesis, radiation, temperature, heat transfer, magnetic field

<b>Unit Title:</b>	<b>Geology</b>	<b>Number of Days:</b>	<b>22</b>	
<b>Essential Standard:</b>	<b>EEn.2.1 – Explain how processes and forces affect the lithosphere.</b>	<b>EEn.2.2 – Understand how human influences impact the lithosphere.</b>		
Clarifying Objective	Student Friendly Objective	Assessment / Evidence of Proficiency	Instructional Strategies / Resources / Informational Technology Integration	Essential Vocabulary

<p>EEn.2.1.1 Explain how the rock cycle, plate tectonics, volcanoes, and earthquakes impact the lithosphere.</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Explain the rock cycle and what drives its processes.</li> <li>*Explain how various mechanisms drive movement of lithospheric plates.</li> <li>*Infer the relationship between the type of plate boundary and the locations of features.</li> <li>*Explain volcanic effects on the lithosphere and how they relate to plate boundaries.</li> <li>*Describe the anatomy of an earthquake.</li> <li>*Summarize major events in the geologic history of North Carolina.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Rock Identification Lab - or interactive online version</p> <p><a href="#">Plate Tectonics Student Interactive &amp; Activity from NOAA</a></p> <p><a href="#">Mystery of Megavolcano PBS Activity--can purchase DVD to accompany group activity</a></p> <p>WebQuest: Volcano World</p> <p>Be a Virtual Seismologist - <a href="http://www.sciencecourseware.com/VirtualEarthquake/">http://www.sciencecourseware.com/VirtualEarthquake/</a></p> <p>NC Geological Survey-search for NC seismic activity <a href="http://www.iris.edu/seismon/">http://www.iris.edu/seismon/</a></p> <p>Volcanoes- Use Google Earth to visit the different volcanoes and discuss their shapes and describe how they erupt.</p> <p><a href="#">Snickers Science</a></p> <p>Barrier Island Formation Research – “The Rise and Fall of the Barrier Islands” – student research how they form and disappear</p>	<p>rock, sedimentary rock, metamorphic rock, igneous rock, bedding, foliation, physical weathering, chemical weathering, transport, deposition, heat energy, mechanical energy, gravitational potential, mantle convection, plate boundary, convergent, divergent, transform, oceanic to oceanic, oceanic to continental, continental to continental, ocean trench, mountains, mid-ocean ridge, magma, lava, volcano, shield cone, cinder cone, composite cone, fissure, eruption, lahar, earthquake, focus, epicenter, seismic waves, P wave, S wave, magnitude, Appalachian orogeny, fall zone, Shorelines, barrier islands, migration, valleys, river basins, geologic time scale</p>
<p>EEn.2.1.2 Predict the locations of volcanoes, earthquakes, and faults based on information contained in a variety of maps.</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Infer the locations of volcanoes, earthquakes, and faults from soil, geologic and topographic map studies.</li> <li>*Predict the locations of geologic hazards on maps.</li> </ul>		<p>Guided Notes, Diagrams</p> <p><a href="#">Locating an Epicenter--Hawaii</a></p> <p>Variety of topographic map skills practice worksheets</p> <p><a href="#">Playdoh Mountains</a></p> <p>Plate Boundary Map Activity</p>	<p>Strike-slip fault, reverse fault, thrust fault, normal fault, soil map, geologic map, topographic map</p>

<p>EEn.2.1.3 Explain how natural actions such as weathering, erosion (wind, water and gravity), and soil formation affect Earth's surface.</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Describe the formation and composition of soil.</li> <li>*Explain the differences in chemical and physical weathering.</li> <li>*Explain how weathering rates are affected by a variety of factors.</li> <li>*Compare erosion by water, wind, ice and gravity on various landforms.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Chemical Weathering Lab using "acid rain"</p> <p>Porosity Lab</p> <p>Weathering Debate - Which type of weathering is worse (chemical or physical)? The goal is for students to understand how they are interconnected.</p>	<p>soil, sand, silt, clay</p>
<p>EEn.2.1.4 Explain the probability of and preparation for geohazards such as landslides, avalanches, earthquakes and volcanoes in a particular area based on available data</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Infer where development should take place to reduce impacts by geohazards.</li> <li>*Explain precautions that can be made to protect life from geohazards.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>For Earthquakes <a href="http://tlc.discovery.com/convergence/quakes/interactives/makeaquake.html">http://tlc.discovery.com/convergence/quakes/interactives/makeaquake.html</a> - the simulation shows students that base isolation is the best construction method to use and that sturdy ground is best to build a building on.</p> <p>Spaghetti Earthquake Engineering Project</p> <p>Video - "Great Los Angeles Earthquake" or "Engineering Earthquakes"</p>	<p>Landslides, earthquakes, tsunamis, sinkholes, groundwater pollution, flooding</p>

EEn.2.2.1 Explain the consequences of human activities on the lithosphere (such as mining, deforestation, agriculture, overgrazing, urbanization, and land use) past and present.	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Explain the consequences of various types of land use.</li> <li>*Explain ways to reduce human impacts on the lithosphere and maximize sustainable use of natural resources.</li> <li>*Explain the effects of human activity on shorelines.</li> <li>*Explain the effects of human activity on mountainsides.</li> </ul>		<p>Guided Notes, Diagrams</p> <p><a href="#">Interactive map of the beach</a></p> <p><a href="#">Storm water runoff</a></p> <p>Cookie Mining Activity</p> <p>Making a Mountain out of a Mole Hole – The effect of dumping trash in the world’s oceans</p>	Urbanization, deforestation, agriculture, artificial stabilization
EEn.2.2.2 Compare the various methods humans use to acquire traditional energy sources (such as peat, coal, oil, natural gas, nuclear fission, and wood).	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Compare the methods of obtaining energy resources.</li> </ul>	Unit 2 Test	<p>Guided Notes, Diagrams</p> <p>National Energy Resource – Research and Presentation</p> <p>Unit Review Activities</p>	Peat, wood, mining, drilling
<b>Unit Title:</b>	<b>Hydrosphere</b>	<b>Number of Days:</b>	<b>16</b>	
<b>Essential Standard:</b>	<b>EEn.2.3 – Explain the structure and processes within the hydrosphere.</b>	<b>EEn.2.4 – Evaluate how humans use water.</b>		
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<p>EEn.2.3.1 Explain how water is an energy agent (currents and heat transfer).</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Explain how the density of ocean water is affected by temperature.</li> <li>*Explain how the density of water results in major ocean currents distributing heat away from the equator toward the poles.</li> <li>*Explain how coastal climates are moderated by water.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Salinity &amp; Heating Lab</p> <p>Convection Currents Demonstration</p>	<p>density, current, specific heat</p>
<p>EEn.2.3.2 Explain how ground water and surface water interact.</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Illustrate the water cycle.</li> <li>*Explain the connection between groundwater and surface water.</li> <li>*Explain river systems including NC river basins, aquifers, and watersheds</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Water Cycle Drawing</p> <p>Water from Trees Lab</p> <p>Interpret map of North Carolina Watersheds and Rivers - analyze similarities and differences.</p>	<p>groundwater, surface water, water cycle, river basin, aquifer, watershed, flood</p>

<p>EEn.2.4.1 Evaluate human influences on freshwater availability.</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Explain various water uses by humans and evaluate for benefits and consequences of use.</li> <li>*Explain consequences of aquifer depletion including subsidence and salt-water intrusion on the coast.</li> <li>*Evaluate the effects of population growth on potable water resources.</li> <li>*Explain how pollutants might flow through a watershed.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Runoff Demonstration</p> <p>Ground Water Pollution Lab</p>	<p>well, aquifer depletion, subsidence, saltwater intrusion, dam, potable, nonpotable</p>
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<p>EEn.2.4.2 Evaluate human influences on water quality in North Carolina's river basins, wetlands and tidal environments.</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Evaluate issues of ground and surface water pollution, wetland and estuary degradation, and salt water intrusion.</li> <li>*Analyze how drinking water and wastewater treatment systems impact quantity and quality of water.</li> <li>*Evaluate water quality of NC streams.</li> <li>*Analyze non-point source pollution and effects on water quality.</li> <li>*Evaluate conservation measures to maximize quality and quantity of available freshwater</li> </ul>	<p>Unit 3 Test</p>	<p>Guided Notes, Diagrams</p> <p>Effects of Katrina / BP Oil Spill articles or research</p> <p>Water Quality Survey for area - analyze what is in the water you drink - school tap and water fountain.</p> <p>Discuss why people stock up on drinking water before a storm / catastrophic event.</p> <p>Unit Review Activities</p>	<p>wetland, estuary, biotic index, water quality, non-point source and point source pollution, stormwater runoff, sedimentation,</p>
<p><b>Unit Title:</b></p>	<p><b>Environmental Science</b></p>	<p><b>Number of Days:</b></p>	<p><b>20</b></p>	
<p><b>Essential Standard:</b></p>	<p><b>EEn.2.7 – Explain how the lithosphere, hydrosphere and atmosphere individually and collectively affect the biosphere.</b></p>	<p><b>EEn.2.8 – Evaluate human behaviors in terms of how likely they are to ensure the ability to live sustainably on Earth.</b></p>		



Clarifying Objective	Student Friendly Objective	Assessment / Evidence of Proficiency	Instructional Strategies / Resources / Informational Technology Integration	Essential Vocabulary
EEn.2.7.1 Explain how abiotic and biotic factors interact to create the various biomes in North Carolina.	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Explain how biotic and abiotic factors determine biome classification.</li> <li>*Compare impacts of biotic and abiotic factors on biodiversity.</li> <li>*Match landforms and soils to biomes.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Biome Booklets</p> <p>Abiotic/Biotic Charts</p> <p><a href="http://www.nclearn.org">www.nclearn.org</a> - click on the learning materials tab and the environmental explorations link.</p>	<p>biome, temperate deciduous forest, temperate rainforest, biotic factor, abiotic factor</p>
EEn.2.7.2 Explain why biodiversity is important to the biosphere.	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Define the biosphere as all life on Earth.</li> <li>*Infer the relationship between environmental conditions and plants and animals.</li> <li>*Explain the global impact of loss of biodiversity.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Invasive Species Articles</p> <p>Deforestation Impact Activity - "Red Headed Spotted Woodpecker"</p> <p>Invasive Species "Wanted Poster"</p>	<p>biosphere, biodiversity, invasive species, overharvesting</p>

<p>EEn.2.7.3 Explain how human activities impact the biosphere.</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Explain effects of human population growth, habitat alteration, introduction of invasive species, pollution and overharvesting on various plant and animal species in NC.</li> <li>*Explain effects of invasive nonnative species on an NC ecosystem.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Kudzu Research</p> <p>The Ladybug Killers - Japanese Beetles - the effect on the United States</p> <p><a href="#">NOAA Ocean Pollution Biomagnification &amp; Noise Pollution Student Interactive</a></p>	
<p>EEn.2.8.1 Evaluate alternative energy technologies for use in North Carolina.</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Critique the benefits, costs and environmental impact of various alternative sources of energy for North Carolina.</li> <li>*Evaluate which sources of alternative energy may work best in different parts of the state.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Alternative resource research - finding something new we can use when others run out.</p>	<p>alternative energy source, renewable/ nonrenewable resource</p>

EEEn.2.8.2 Critique conventional and sustainable agriculture and aquaculture practices in terms of their environmental impacts.	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Critique the advantages and disadvantages of traditional agriculture/aquaculture techniques and compare with sustainable agriculture/aquaculture techniques.</li> <li>*Judge potential impact of sustainable techniques on environmental quality.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Guest Speaker - local farmer</p> <p>Debate on conventional vs. sustainable Agri and Aquaculture</p> <p>Venn Diagrams</p> <p>Observe local farms - what crops do they grow? Advantages and disadvantages to plant more than one crop a season: tobacco, soybeans, corn, winter rye, wheat</p>	agriculture, aquaculture, sustainable
EEEn.2.8.3 Explain the effects of uncontrolled population growth on the Earth's resources.	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Explain carrying capacity.</li> <li>*Infer limiting factors to human population growth.</li> <li>*Summarize the impacts of a growing population on the natural resources in North Carolina.</li> </ul>		<p><a href="#">Word of 7 Billion--Numerous Human Population Growth Activities</a></p> <p>Guided Notes, Diagrams</p> <p>Guided discussion</p> <p>Graphing carrying capacity curves.</p> <p>Human population graphs.</p>	population
EEEn.2.8.4 Evaluate the concept of "reduce, reuse, recycle" in terms of impact on natural resources.	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Explain how ecological footprints exist at the personal level and extend to larger scales.</li> <li>*Evaluate personal choices in terms of impacts on availability of natural resources and environmental quality.</li> </ul>	Unit 4 Test	<p>Guided Notes, Diagrams</p> <p>Creating posters for reducing a carbon footprint - ways, importance, tie in "Reduce, Reuse &amp; Recycle"</p> <p>EPA website - <a href="http://www.epa.gov/osw/conserve/rrr/">www.epa.gov/osw/conserve/rrr/</a></p> <p>Unit Review Activities</p>	reduce, reuse, recycle

<b>Unit Title:</b>	<b>Meteorology</b>	<b>Number of Days:</b>	<b>18</b>	
<b>Essential Standard:</b>	<b>EEn.2.5 – Understand the structure of and processes within our atmosphere.</b>	<b>EEn.2.6 – Analyze patterns of global climate change over time.</b>		
Clarifying Objective	Student Friendly Objective	Assessment / Evidence of Proficiency	Instructional Strategies / Resources / Informational Technology Integration	Essential Vocabulary
EEn.2.5.1 Summarize the structure and composition of our atmosphere.	<p>The student will be able to:</p> <p>*Summarize information from charts and graphs regarding layers of the atmosphere.</p>		<p>Guided Notes, Diagrams</p> <p>Layers of the Atmosphere Graphing - based on temperature and altitude</p>	<p>Troposphere, Stratosphere, Mesosphere, Thermosphere, Exosphere</p>
EEn.2.5.2 Explain the formation of typical air masses and the weather systems that result from air mass interactions.	<p>The student will be able to:</p> <p>*Explain how air masses move.</p> <p>*Explain how interactions of air masses form frontal boundaries, clouds, and affect wind patterns.</p>		<p>Guided Notes, Diagrams</p> <p>Global Wind Patterns Drawing Lab</p>	<p>Wind, airmasses, fronts</p>

<p>EEn.2.5.3 Explain how cyclonic storms form based on the interaction of air masses.</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Explain factors that affect air density.</li> <li>*Understand the influence of air density on winds, air masses, fronts and storm systems.</li> <li>*Use data to substantiate explanations and provide evidence of various air mass interactions.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Cloud Identifications</p> <p>Tornado vs. Hurricane Debate</p> <p>Hurricane Tracking Online Research Project</p>	<p>Storm system, hurricane</p>
<p>EEn.2.5.4 Predict the weather using available weather maps and data (including surface, upper atmospheric winds, and satellite imagery).</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Observe, analyze and predict weather using technology.</li> <li>*Interpret and analyze weather maps.</li> <li>*Interpret and analyze relative humidity charts.</li> <li>*Explain the importance of water vapor and its influence on weather.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Weather Mapping using The Weather Channel Website  <a href="http://www.weather.com">www.weather.com</a></p> <p>Creating local weather maps</p> <p>Relative humidity labs</p> <p>Reading a weather station activity</p> <p>Human barometer</p>	<p>Weather maps, water vapor, clouds, relative humidity, dew point, precipitation</p>

EEn.2.5.5 Explain how human activities affect air quality.	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Explain how acid rain is formed.</li> <li>*Explain how human activities can alter the pH of rain.</li> <li>*Infer other human activities that impact the quality of atmospheric composition.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>How to kill a plant lab - using acid rain</p> <p>Online research into CFCs - which country is the worst, best and who has the tightest controls on the industry.</p>	pH, acid rain
EEn.2.6.1 Differentiate between weather and climate.	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Explain major climate categories</li> <li>*Compare weather and climate.</li> </ul>		<p>Guided Notes, Diagrams</p>	Climate, weather
EEn.2.6.2 Explain changes in global climate due to natural processes.	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Summarize natural processes that can and have affected global climate.</li> <li>*Explain the concept of the greenhouse effect.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Yellowstone National Park predictions based on research.</p> <p>Video - "An Inconvenient Truth"</p>	El Nino/La Nina, sunspots, greenhouse gases, greenhouse effect

<p>EEn.2.6.3 Analyze the impacts that human activities have on global climate change (such as burning hydrocarbons, greenhouse effect, and deforestation).</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Outline how deforestation and the burning of fossil fuels contribute to global climate change.</li> <li>*Explain how large-scale development contributes to regional changes in climate.</li> <li>*Analyze actions that can be taken by humans to lessen global climate change.</li> </ul>		<p>Guided Notes, Diagrams</p> <p>Pro/Con Chart</p> <p>Earth Day Research - 100 Ways you can change and Maintain Mother Earth</p>	<p>Heat island</p>
<p>EEn.2.6.4 Attribute changes to Earth's systems to global climate change (temperature change, changes in pH of ocean, sea level changes, etc.).</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>*Analyze how changes in global temperatures affect the biosphere.</li> <li>*Explain how changes in the atmosphere contribute to ocean acidification.</li> <li>*Analyze the effects of ocean acidification on ocean life.</li> <li>*Explain how changes in global temperature have and will impact sea level.</li> <li>*Analyze how sea level has been affected by other earth processes.</li> </ul>	<p>Unit 5 Test</p>	<p>Guided Notes, Diagrams</p> <p>Local agriculture and lake level discussions - Local co-op guest speaker?</p> <p>Freshwater vs. saltwater predictions - what happens if the icecaps melt?</p> <p>Unit Review Activities</p>	<p>biosphere, glaciation, tectonic movements</p>